

WHAT IS CLAIMED IS:

1. A press unit for dewatering a fiber web, said press unit comprising:

first and second opposing press elements, said first press element and said second press element together forming a nip therebetween;

at least one anti-rewet fabric configured for carrying the fiber web through said nip, each
5 said anti-rewet fabric having a first fabric side and a second fabric side, each said anti-rewet fabric including:

at least one air distribution fabric layer, one air distribution fabric layer being configured for contacting the fiber web; and

at least one of a perforated film layer and a spectra membrane, said at least one of a
10 perforated film layer and a spectra membrane being comprised of one of a polymeric film, a polyester film and a plastic film, said at least one of a perforated film layer and a spectra membrane having a first film side and a second film side, said first film side being one of laminated and attached to said one air distribution fabric layer, said second film side being directed toward one of said first and second press elements.

2. The press unit of claim 1,

wherein the structure of said spectra membrane is such that water contact with the distribution fabric layer is broken.

3. The press unit of claim 1,

wherein said anti-rewet fabric comprises more than two layers.

4. The press unit of claim 3,
wherein said anti-rewet fabric comprises a third backside layer that is very coarse.
5. The press unit of claim 3,
wherein a backside air distribution fabric layer is provided.
6. The press unit of claim 1,
including a vented roll disposed on the backside of the anti-rewet fabric, and said vented roll has a rough surface.
7. The press unit of claim 1,
wherein said anti-rewet fabric comprises a multi layer structure as follows: air distribution layer/perforated film layer and/or spectra membrane/air distribution layer/perforated film layer and/or spectra membrane.
8. The press unit of claim 7,
wherein a final backside water holding air distribution layer is provided.
9. The press unit of claim 1,
wherein said perforated film layer comprises one of a polymeric film layer and a polyester film layer coated with adhesive on at least one side, and holes through both the perforated film layer and the adhesive.

10. The press unit of claim 1,
wherein said first press element is an enclosure, said second press element is a counter element positioned opposite said enclosure, and said second film side being directed toward said counter element.

11. The press unit of claim 10,
wherein said enclosure contains a pressurized fluid.

12. The press unit of claim 11,
wherein said pressurized fluid is at least one of air, steam and a heated gas.

13. The press unit of claim 10,
wherein said enclosure includes three juxtaposed rolls and said counter element is a fourth roll further juxtaposed to said three juxtaposed rolls of said enclosure, said press unit thereby defining a four-roll press arrangement.

14. The press unit of claim 10,
wherein said enclosure is a box having a pressurized fluid therein, and said counter element is one of a roll, a shoe, a vented box and a suction box.

15. The press unit of claim 10,
wherein said counter element is one of a roll, a shoe and a vented box.

16. The press unit of claim 15,
wherein said counter element is a roll, said roll being at least one of vented, grooved,
blind drilled, drilled, and connected to a source of suction.

17. The press unit of claim 1,
wherein said at least one anti-wet fabric includes a first anti-rewet fabric, said press unit
further comprising a second fabric, said first anti-wet fabric being configured so as to be
arranged between the fiber web and said counter element, said second fabric configured so as to
5 be arranged between the fiber web and said enclosure.

18. The press unit of claim 17,
wherein the press unit is part of a papermaking machine, one of said second fabric and
said first fabric being configured for transferring the fiber web to a next station of said
papermaking machine.

19. The press unit of claim 1,
wherein said first anti-wet fabric and said second anti-wet fabric have a first permeability
and a second permeability, respectively, said first permeability being one of equal to and greater
than said second permeability.

20. The press unit of claim 1,
wherein said second fabric comprises a resistive layer, at least one of a perforated film
layer and a spectra membrane, and an air distribution fabric layer.

21. The press unit of claim 20,
wherein said resistive layer is toward the first press element and said air distribution fabric layer is toward the fiber web.

22. The press unit of claim 1,
wherein said press unit further comprises a second fabric configured so as to be arranged between the fiber web and said first press element, and said second fabric comprises more than three layers.

23. The press unit of claim 22,
wherein said second fabric comprises a multi layer structure as follows: resistive layer/perforated film layer and/or spectra membrane/air distribution fabric layer/perforated film layer and/or spectra membrane/air distribution fabric layer.

24. The press unit of claim 1,
wherein at least one fabric comprises at least two of a perforated film layer and a spectra membrane, and the permeability thereof is adjusted by the registration of the holes.

25. The press unit of claim 1,
wherein at least one fabric is constructed for pattern pressing.

26. The press unit of claim 25,

wherein said at least one fabric constructed for pattern pressing comprises a spectra membrane molded with the pattern.

27. An anti-rewet fabric for carrying a fiber web through an air press, the anti-rewet fabric comprising:

at least one air distribution fabric layer, one said air distribution fabric layer being configured for contacting the fiber web; and

5 at least one of a perforated film layer and a spectra membrane, at least said perforated film layer being comprised of one of a polymeric film, a polyester film and a plastic film, at least said perforated film layer having a first film side and a second film side, said first film side being one of laminated and attached to said one said air distribution fabric layer.

28. The anti-rewet fabric of claim 27,

wherein said anti-rewet fabric comprises more than two layers.

29. The anti-rewet fabric of claim 28,

wherein said anti-rewet fabric comprises a third backside layer that is very coarse.

30. The anti-rewet fabric of claim 28.

wherein a backside air distribution fabric layer is provided.

31. The anti-rewet fabric of claim 27, further comprising a multi layer structure as follows: air distribution layer/perforated film layer and/or spectra membrane/air distribution layer/perforated film layer and/or spectra membrane.

32. The anti-rewet fabric of claim 31,
wherein a final backside water holding air distribution layer is provided.

33. The anti-rewet fabric of claim 27,
wherein said perforated film layer comprises one of a polymeric film and a polyester film coated with adhesive on one or both sides, and holes put through both the perforated film layer and the adhesive.

34. The anti-rewet fabric of claim 27,
wherein each said air distribution fabric layer includes one of a plain weave and a multi-float weave.

35. The anti-rewet fabric of claim 27,
wherein each said air distribution fabric layer includes a multi-float weave.

36. The anti-rewet fabric of claim 27,
wherein said perforated film layer has a series of perforate holes therein, each set of most-closely spaced perforate holes being separated by a perforate distance, each said air distribution fabric layer having a fabric weave associated therewith, said fabric weave having a

5 weave repeat distance, said weave repeat distance being one of equal to and greater than said perforate distance.

37. The anti-rewet fabric of claim 36,
wherein said weave repeat distance is greater than said perforate distance.

38. The anti-rewet fabric of claim 27,
wherein said perforated film layer has a series of perforate holes therein, said perforated film layer having about at least 40,000 holes/m².

39. The anti-rewet fabric of claim 27,
wherein said perforated film layer has a series of perforate holes therein, said perforated film layer having about at least 200,000 holes/m².

40. The anti-rewet fabric of claim 27,
wherein said at least one of a perforated film layer and a spectra membrane has an open area in the approximate range of 1 % to 30 %.

41. The anti-rewet fabric of claim 27,
wherein said at least one of a perforated film layer and a spectra membrane has an open area in the approximate range of 5 % to 15 %.

42. The anti-rewet fabric of claim 27,
said at least one of a perforated film layer and a spectra membrane has a thickness of less
5 than about 0.04 inches.

43. The anti-rewet fabric of claim 42,
wherein said at least one of a perforated film layer and a spectra membrane has a
thickness of less than about 0.005 inches.

44. The anti-rewet fabric of claim 27,
wherein each air distribution fabric layer is made of a sateen fabric.

45. A clothing for a press unit for dewatering a fiber web, comprising;
at least one anti-rewet fabric having at least one air distribution fabric layer, one said air
distribution fabric layer being configured for contacting the fiber web; and at least one of a
perforated film layer and a spectra membrane, at least said perforated film layer being comprised
5 of one of a polymeric film, a polyester film and a plastic film, at least said perforated film layer
having a first film side and a second film side, said first film side being one of laminated and
attached to said one said air distribution fabric layer,
wherein said at least one anti-rewet fabric includes a first anti-rewet fabric and said
clothing further comprises a second fabric.

46. The clothing of claim 45,
wherein said second fabric comprises a resistive layer, at least one of a perforated film
layer and a spectra membrane, and an air distribution fabric layer.

47. The clothing of claim 45,

wherein said second fabric comprises more than three layers.

48. The clothing of claim 47,

wherein said second fabric comprises a multi layer structure as follows: resistive layer/perforated film layer and/or spectra membrane/air distribution fabric layer/perforated film layer and/or spectra membrane/air distribution fabric layer.

49. The clothing of claim 45,

wherein at least one fabric comprises at least two of a perforated film layer and a spectra membrane, and the permeability thereof is adjusted by the registration of holes.

50. The clothing of claim 45,

wherein at least one fabric is constructed for pattern pressing.

51. The clothing of claim 50,

wherein said fabric constructed for pattern pressing comprises a spectra membrane molded with the pattern.

52. A method of conveying a fiber web into an air press, said air press having a nip, said method comprising the steps of:

providing an anti-rewet fabric for carrying the fiber web through said air press, said anti-rewet fabric comprising:

5 at least one air distribution fabric layer configured for contacting the fiber web; and
 at least one of a perforated film layer and a spectra membrane, at least said perforated
film layer being comprised of one of a polymeric film, a polyester film and a plastic film, at least
said perforated film layer having a first film side and a second film side, said first film side being
one of laminated and attached to one said air distribution fabric layer, and
10 carrying the fiber web on one said air distribution fabric layer of said anti-rewet fabric
into said air press through said nip.

53. A papermaking machine for making a fiber web, said papermaking machine
comprising:

 a plurality of conveyor rolls for carrying the fiber web;
 first and second opposing press elements, said first press element and said second press
5 element together forming a nip therebetween;

 at least a first anti-rewet fabric configured for carrying the fiber web through said nip,
said first anti-rewet fabric including:

 at least one air distribution fabric layer, one said air distribution fabric layer being
configured for contacting the fiber web; and

 at least one of a perforated film layer and a spectra membrane, at least said perforated
film layer being comprised of one of a polymeric film and a polyester film, at least said
perforated film layer having a first film side and a second film side, said first film side being one
of laminated and attached to one said air distribution fabric layer, said second film side being
directed toward one of said first and second opposing press elements.

54. A method for dewatering a fiber web, the fiber web initially containing water therein, said method comprising the steps of:

providing an air press for dewatering the fiber web, said air press having a nip and an air pressure chamber, said air pressure chamber having air under pressure therein;

5 providing a first fabric and a second fabric for carrying the fiber web through said air press;

carrying the fiber web between said first fabric and said second fabric through said nip and into said air pressure chamber of said air press; and

10 displacing the water initially contained in said fiber web with the air in said air pressure chamber.

55. The method of claim 54,

wherein at least said first fabric is an anti-rewet fabric, said anti-rewet fabric being configured for promoting only a one-way flow of water therethrough, said one-way flow being directed away from the fiber web.

56. The method of claim 54,

wherein at least one of said first fabric and said second fabric has a three-dimensional structure configured for creating an imprint thereof in the fiber web.